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ABSTRACT

The ideal traits for an online searcher, as identified in studies by online vendors and suppliers, are discussed: (1) curiosity and a desire to learn, (2) adaptability, (3) comfortableness with the machine interaction process, (4) ability to cope with instances of system failure, (5) patience and persistence, and (6) a logical, thorough, analytical mind. The paper also examines the fears and frustrations of beginning searchers, provides examples of human error and machine failure, and delineates the frustrations of database suppliers and vendors in educating searchers. The use of print tools in developing search strategies is stressed, and motivation for self-improvement is emphasized as a paramount goal of online training. A list of ranked recommended readings is appended. (Author/RAA)

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On-line Training: the Psychology of Machine-Human Interface

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ABSTRACT

The ideal traits of a searcher in bibliographic data bases are discussed, based on studies by on-line vendors and suppliers. The fears and expectations of beginning searchers are described. Examples of human error and of machine failure are given. Stress is placed on the use of print tools for learning how to design strategies. Frustrations on the part of data base suppliers and vendors in trying to educate the searcher are delineated. Motivation for self-improvement in perfecting the ability to do efficient interactive searching is emphasized as the goal of on-line training. A list of recommended readings, ranked by the author is appended. The desirable traits of a searcher discussed are: 1) curiosity and a desire to learn 2) adaptability 3) comfortableness with the machine interaction process 4) ability to cope with the instances of system failure 5) patience and persistence and a 6) logical, thorough, analytical mind. Throughout the comments, observations and recommendations of a practical nature are made in a conversational style of presentation. Technical jargon is avoided.

Machines should be perfect, never break down, accept human error, and be subservient to people. Many of us feel the above sentiments, but, in actuality, machines are far from perfect, often break down, are not tolerant of human error, and appear to be superior to people in many ways.

Perhaps the knowledge that any machine will reflect its human operator puts an uncomfortable feeling in the pit of our stomachs when we first try to master a new machine. "Garbage in, garbage out," is not a phrase to inspire confidence in the efforts of a computer terminal trainee.

An additional psychological factor may be that many people who tackle terminal mechanics and data base search strategies for the first time frequently have expertise in other areas of bibliographic retrieval and, therefore, are wary about risking their pride on areas that may prove initially embarrassing to them.

How can on-line training be made to motivate rather than inhibit the learning process in the uninitiated, while hopefully proving its worth in terms of time spend and of results obtained? This paper, under the constraints of brevity, attempts to explore this challenge in the psychology of machine-human interface.

WORKSHOP: FINANCIAL WASTE AND DOUBTFUL RESULTS

At the meeting of the Medical Library Education Group of the Medical Library Association in Seattle (June, 1977), representatives of several data vending services voiced an unanimous complaint: Participants in their on-line workshops seldom studied the search guides prior to attending the training sessions. Furthermore, past attendees often made expensive phone calls to vendors via WATS lines for trouble-shooting emergencies that had been covered repeatedly in the training experience.

Another complaint focused on the glaring lack of interest in on-line contact opportunities offered at national meetings of users, often at great expense for the vendors. The only avenue of assuring attendance seems to be via credit in continuing education (CE) courses. For instance, the CE course in the use of BIOSIS and its print tools is usually well attended at Medical Library Association meetings.

From the point of view of the user, that is, the searcher in a library, the workshops are of little practical value other than the symbolic one of having a certificate to show back home. Actually, very little can be accomplished in a few hours when control over the level of expertise of the participants is not always feasible, much less any sort of guaranteed preparation by attendees beforehand.

SEARCHERS--A SHOPPING LIST: PITFALLS, LIMITATIONS, DESIDERATA

The National Science Foundation supported an "on-line impact study" by the System Development Corporation (December, 1975), with imput from nine different on-line suppliers, including among others* The National Library of Medicine, the National Aeronautics and Space Administration, the Defense Documentation Center, the Energy Research and Development Administration, and Lockheed Missile and Space Company.

This survey revealed that three-fourths of on-line searchers are librarians, the majority of which have some previous familiarity with the data bases searched, by contact with the printed tools of that service. Of interest to our investigation of psychological factors is that the "right" personality ranked (by information managers) about on par with knowledge of automation. The personality feature seems to indicate some ability at communication (two-way)skills, such as in evaluating user needs.

Typical of initial fears of new searchers, found in the study, is the fear of being replaced by a computer, indicating what the investigators termed a "pronounced lack of confidence".

Regarding the background of new searchers, reference experience with some knowledge of data bases and a subject specialty

in the bases to be used seemed of greatest importance.

Perhaps the following rated qualities mentioned by superiors in choosing new searchers is worth further comment:

1) curiosity and a desire to learn
2) adaptability
3) comfortableness with the machine interaction process
4) ability to cope with instances of system failure
5) patience and persistence
6) a logical, thorough, analytical mind (most cited)

An expansion of these traits, brings the folowing considerations to mind.

Curiosity and a Desire to Learn

It is hard to conceive that a librarian, especially in an academic or special library, would not have a great amount of curiosity about the much-touted computerized retrieval of medical literature. What is meant, however, by curiosity here is not of the casual variety, but rather a penchant for experimentation that overrides a fear of appearing ridiculous in the eyes of others. A desire to learn is part of such curiosity, expecially in the sense of a desire to learn from errors, somewhat akin to interactive feedback.

Adaptability

Perhaps the crux of the matter of training staff for computers is in finding people whose attitudes towards innovation are not bound to secret hopes that everything in automation will prove a colossal mistake and return to the days of the "tried and true". Adaptability means rolling with the punches, taking the bad with the good. Debugging a new program, for example, requires that judgement be held in reserve. Starting up a new vendor service involves many delays and dissapointments even with the best of modern technology. The history of the Bell System is replete with almost as many steps backward as forward. Machines are not as devious as people so that results either come back immediately or not at all. Fellow workers sometimes circumvent direct pertinent responses, allowing a certain amount of interpretation or leeway which machines do not permit, unless the software has been designed to be diplomatic. Adaptability is keeping an open mind and being willing to try once more (see "patience and persistence" below).

Comfortableness with Machine Interaction

Living with a computer terminal requires a modicum of token fetishism for things electronic. Fascination with gimmicks or new tricks wears thin fairly quickly and the 1200 baud terminal is not going to play Star Trek space games with the operator. The software does not, blessedly, become sarcastic or impatient. Some software packages are even friendly when treated with the right password and a good connection

fiber optics, giving the searcher a cheery "Hello from Elhill" or, with a little imagination, a news update on the ski conditions in Vail. Some librarians see the computer as a nice guarantee against early retirement and, therefore, affect a comraderie that is less than sincere for their carriage return. Playing with the data banks has come into disfavor, as well as checking up on your latest disease with BIOSIS or MEDLINE, but the interaction between the searcher and the central processing unit (CPU) can prove challenging even after the newness has worn off.

Ability to Cope with Failure

Telephone lines, according to the phone company, function when all else fails. Lines may function most of the time, but a clean signal does not always shine forth, leaving in its unchaste wake a garbled message to the searcher. Particulary frustrating is the system's refusal to even acknowledge your user ID and password due to "garbage" on the line. The moments when the mother computer (CPU) is unavailable may vary from a few seconds to the infamous "down time" of complete inaccessability. These electromechanical delays are understandable and do not reflect on the searcher unfavorably.

Other failures, such as inappropriate or overly complicated commands (so-called "stacked" commands), tend to frustrate the searcher and perhaps embarrass him in the presence of the end-user.

A more basic failure is the lack of entry vocabulary suited to the data base and the needs of the user; presumably, a knowledge of the search guide or thesaurus for that file would minimize such difficulties. In the face of such possibilities as outlined above, the wise searcher knows alternate strategies, even to the point of coming back again after resting himself. (the machine, in case of searcher frustration, is not impressed with swift kicks or ripe insults to which it may respond with a non-committal "message unclear".)

Patience and Persistence

The greatest patience needed is in understanding the goal of the search, as expressed by the end-user. Sometimes a "hidden agenda" is behind vague explanations: it may be that the user hopes that nothing will be found ("0" hits) in order to justify his doing new research. The user may be sincerely vague himself, in need of help from the computer to define the framework of his search, gaining, among other benefits, a precise (controlled) vocabulary for the parameters that become apparent during the interaction with the data base. Once the search is fairly well defined, the user may insist on switching to different files in order to cross-check responses. The searcher may feel somewhat inconvenienced at shifting command entry vocabulary to accomodate the various programming of different software as he changes vendors and files.

A Logical, Thorough, Analytical Mind

It would be nice, perhaps, to have National Library of Medicine indexers as the library search analysts. Short of that doubtful possibility, a background in languages or linguistics could foreseeably give a searcher a slight edge when dealing with the intricacies of, say, a Permuted or Annotated Trees Medical Subject Headings entry (MeSH list).+ Machine logic does require a measure of consistency on the part of the operators, but then so do many print tools. Knowledge of priorities or hierarchies of commands may enhance results from complicated search statements, particularly regarding the order in which Boolean operators are executed.

Hopefully, the end-user has an analytical mind as he outlines his request, making the added imput from the searcher in the nature of "fine tuning" adjustments. Most of the thesauri are highly analytical in format, so that following their suggested methodology is far from being completely on your own. Thoroughness is a two-edged sword; sometimes it is a definite plus, but its excess may produce wasted connect time. The most thorough attack (other than rapid "quick-and-dirty" forays) is that of having alternate strategies at your fingertips. An overly thorough initial interview with the user, however, may be either threatening to him or just plain irritating if he perceives the searcher as too fussy.

SUMMARY: THE IMPORTANCE OF MOTIVATION

Any training program for on-line retrieval would do well to emphasize to future participants the importance of studying the search guides and manuals provided by vendors (BRS, Lockheed, and SDC) and data base suppliers (BIOSIS, ERIC, NTIS, SSIE, etc.). A pre-test, were it to be announced in advance, could encourage reading beforehand.

Experience or contact of some kind with the printed tools of the data base definitely is advantageous to successful computer retrieval, particularly in formulating efficient search strategies in the entry vocabulary of the file being used.

During the actual training, the philosophy of various vendors and characteristics of their programming should be explored in as great a detail as time permits. A chart summary of commands for the most frequently interrogated systems would be helpful, such as the one by NFAIS (National Federation of Abstracting and Indexing Services). The appropriateness of one data base over others for specific types of searches would guide searchers in how best to advise their users.‡

Whenever practical, workshops should be preceded by some initial experience on the terminal, either with the guidance of someone slightly more experienced or by the new searcher alone. Even when minimal, such contact time gives the trainee confidence to ask for

trouble shooting tips beyond simple beginning machine mechanics. The sessions themselves ideally should not have more than some ten persons for every five available terminals so that while one "shift" of five is carrying out searches, the other five can be formulating search strategies to use when it is their turn for "hands-on" contact.

The best motivation for those more or less on their own and not convenient to a training center could possibly be an audio tape discussing the importance of being willing to make mistakes during training and to explore the potential of the retrieval system without fear of ridicule. The absolute necessity of familiarizing yourself with the printed materials and of keeping them on hand during training bears repetition.

The traits of an ideal searcher outlined above may help orient the beginner to the proper frame of mind in dealing with the machine. In the long, run, it probably is the searcher's own desire to better his effectiveness, rather than to please his superiors or acquire another certificate, that will best motivate him to master interactive searching techniques, using a computer.

APPENDIX 1

GUIDE TO RECOMMENDED READINGS

(ranked according to cogency for the author)

1. WAGNER, JUDITH; FISHBURN, MARY; AND CUADRA, CARLOS A. On-line Impact Study: Survey Report of on-line Users, 1974-1975. Santa Monica, System Development Corporation, 1975. Mimeographed.
2. KEENAN, STELLA, ed. Key Papers on the Use of Computer-Based Bibliographic Services. Washington, D.C., American Society for Information Science; Philadelphia, National Federation of Abstracting and Indexing Services, 1973.
3. ADAMS, JOAN TITLEY, ed. Health sciences libraries. Libr. Trends 23: 1-175, July 1974.
4. CHESHIER, ROBERT G. Information in the Health Sciences; Working to the Future. Cleveland, Cleveland Medical Library Association, 1972.
5. MEADOW, CHARLES T. Man-machine communication. New York, John Wiley, 1970.
6. MARTIN, THOMAS H. A Feature Analysis of Interactive Retrieval Systems. Stanford, Institute for Communications Research, Stanford University, 1974
7. CHRISTIAN, ROGER W. The Electronic Library: Bibliographic Data Bases 1975-1976. White Plains, N.Y., Knowledge Industries, 1975
8. MONTGOMERY, LEON. Document Retrieval Systems: Factors Affecting Research Time. New York, Marcel Dekker, 1975.

NOTES

*The others were: Battelle Memorial Institute, Canadian Institute for Scientific and Technical Information, European Space Agency, and the State University of New York.

+Thelman Charen, doyenne of indexers at NLM, in a personal communication has asserted that with her knowledge of Greek and Latin she could index in almost any field.

‡Mr. William Caldwell, at the National Library of Medicine, has produced a slide/tape lecture on such choices involving MEDLARS, BIOSIS, and other files frequently consulted in the health sciences.

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AUTHOR ABSTRACT
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Abstract (up to 200 words):

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Other

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